

## REMARKS

BY this amendment, claims 1 and 2 are revised to place this application in immediate condition for allowance. Currently, claim 1 is before the Examiner for consideration on its merits.

In the rejection, claim 1 is rejected based on 35 U.S.C. § 103(a) and JP 62-278,258 (JP '258). It is the Examiner's position that JP '258 discloses a steel having an overlapping amount of Mn. The Examiner also admits that the claimed carbonitrided surface is not expressly disclosed in JP '258, noting that JP '258 teaches a nitrided surface. Nevertheless, the Examiner contends that the nitrided surface of JP '258 is sufficiently similar to that which is claimed to support a rejection under 35 U.S.C. § 103(a).

Applicants traverse the rejection on the grounds that the steel of JP '258 is not the same or similar as that claimed and a *prima facie* case of obviousness cannot be alleged for this reason alone. Moreover, lacking this similarity means that the Examiner's contention that JP '258 is similar enough to the claimed steel so that the claimed hardness can be presumed to be present is improper.

Claim 1 is amended in two ways to distinguish over the rejection. First, the steel is characterized as an austenitic stainless steel and one with a Mn range of 3 to less than 11%.

The issue of obviousness now becomes whether JP '258 can be said to teach an austenitic stainless steel that has the claimed range of Mn content and the claimed hardness depth.

It is submitted that JP '258 cannot establish a *prima facie* case of obviousness since this reference does not teach the steel of claim 1, as amended, nor is there any reason to modify JP '258 and arrive at the invention of claim 1.

The invention is an improvement in the art of nitriding austenitic stainless steels. As explained in the background art section of the application, it is difficult to surface harden austenitic stainless steels by quenching alone so that nitriding processes are employed. In these processes, the surface is subjected to a low temperature treatment. These low temperature treatments produce the desired hardness but do not produce the desired thickness and the length of the nitriding treatment is long. Increasing the temperature increases the thickness of the nitrided layer, but at the expense of hardness loss.

It is also desired to have a high hardness for wear resistance. Thus, the lower temperature treatment for higher hardness is preferred. This lower temperature treatment, though, produced a brittle hard layer and wear resistance is not good.

The invention resolves this dilemma by providing an austenitic stainless steel that has both good wear resistance and high hardness.

In JP '258, a surface treatment is disclosed, wherein after cold working, a high manganese steel, as being generally defined in JIS G0203 and is referred to as "a non-magnetic alloy steel containing 11% or more of Mn as a principal compositional element and exhibiting austenitic structure". Thus, it can be concluded that JP '258 discloses such a steel since the surface nitrided stainless steel part of JP '258 contains 14.8% Mn and this satisfies the JIS standard noted above.

In comparison, claim 1 defines an austenitic stainless steel that has less than 11% Mn, a particular surface hardness and a particular hardness at a particular depth from the surface. This surface hardness is attained by a pretreatment with a halogen gas and then a carbo-nitriding treatment.

In light of the differences between the invention and JP '258 noted above, Applicants submit that JP '258 does not disclose an "austenitic stainless steel" and cannot be said to be the same as that which is claimed. JP '258 merely discloses a non-magnetic Mn alloy. Failing to disclose an austenitic stainless steel prevents the Examiner from alleging that JP '258 discloses a steel product similar to that claimed.

The mere fact that JP '258 may disclose an austenitic microstructure does not mean that the steel is an austenitic stainless steel and this disclosure cannot be relied upon to support a continued rejection under 35 U.S.C. § 103(a).

Moreover, JP 258 teaches away from employing an austenitic stainless steel for application of nitriding to improved mechanical strength. On page 1, right column, lines 3-8, JP '258 states "when an austenitic stainless steel being widely used is cold-worked for the purpose of insuring mechanical strength, the more the cold-work rate is given, the higher the sharp increase in magnetic permeability is caused, indicating that it is very difficult to enhance the mechanical strength." Two points can be derived from this statement. The first is that JP '258 does not consider the disclosed nonmagnetic Mn steel to be a stainless steel. Second, it is a direct teaching away from the use of a stainless steel in the process of JP '258 to obtain the improvements in wear resistance and fatigue strength, but without increasing magnetic permeability. Therefore, the Examiner has no

basis to allege that the alloy of JP '258 is the same as that claimed or that it would be obvious to use an austenitic stainless steel alloy in place of the non-magnetic alloy of JP '258.

It is also apparent that the alloy of JP '258 is not the same as that claimed from the standpoint of Mn content. Since the Mn content of JP '258 is 14.8% and the upper limit of claim 1 is less than 11%, there is no overlap between the two and the Examiner cannot allege that a *prima facie* case of obviousness based on such an overlap.

In addition, it is submitted that there is no reason to use a Mn content of less than 11% given JP '258's teachings. As stated above, JP '258 teaches a certain class of Mn alloys that have more than 11% so that there would be no reason to go against this desire and allege that it would be obvious to modify the Mn alloy of JP '258 and use less than 11% Mn. To make such an assertion would be the hindsight reconstruction of the prior art based on Applicants' own invention and such an assertion could not be sustained on appeal.

It is also submitted that the rejection is in error for contending that the claimed hardness is present in JP '258. Claim 1 quite clearly defines a particular surface hardness and a particular hardness at a depth of 50  $\mu\text{m}$ . Figure 1 of JP '258 discloses the hardness values along the depth of the nitrided material. This figure reveals a hardness of 780 Hv at a depth of 0.02 mm or 20  $\mu\text{m}$  and a hardness value of 1000 Hv at around 18  $\mu\text{m}$ . The hardness levels off to a value of around 600 Hv at a depth greater than 20  $\mu\text{m}$ , which would include the claimed depth of 50  $\mu\text{m}$ . Comparing the two, JP '528 may disclose a similar hardness at the surface as that claimed, but the claimed value of 1000 Hv at a

depth of 50  $\mu\text{m}$  is nowhere to be found in JP '528. Therefore, the JP '528 cannot be said to teach the claimed steel and its hardness and a *prima facie* case of obviousness.

The Examiner has no basis from which to allege that it would be obvious to somehow modify JP '528 to attain the claimed hardness at a depth of 50  $\mu\text{m}$ . How in fact would such a hardness be achieved? JP '528 teaches a steel, which is not even remotely close to the claimed sub-surface hardness level and this reference cannot support an obviousness contention in this regard.

Applicants also challenge any assertion that the hardness properties of claim 1 could somehow be found in JP '258 based on a similarity in processing. Quite clearly, carbo-nitriding and nitriding are not the same. Moreover, JP '258 does not teach the method of claim 2 and the failure to do so is further substantiation of Applicants' contention that there is no basis from which to allege that a processing similarity between JP '258 and the invention supports a position of inherency regarding hardness. In fact, JP '258 and

In summary and in light of the revisions to claim 1, the prior art does not establish a *prima facie* case of obviousness against claim 1 and the rejection must be withdrawn.

Applicants also acknowledge the election of the Group I invention and claim 1. However, since claim 2 includes the limitations of claim 1 therein and claim 1 is patentable over the prior art, claim 2 is also in condition for allowance and the restriction requirement should be withdrawn.

Applicants also point to MPEP 806.05(h) for the rejoinder rule for non-elected process claims describing the making of a patentable product. This provides further

substantiation that the restriction requirement should be withdrawn and claim 2 passed onto issuance with claim 1.

Accordingly, the Examiner is respectfully requested to examine this application in light of this response and pass claims 1 and 2 onto issuance.

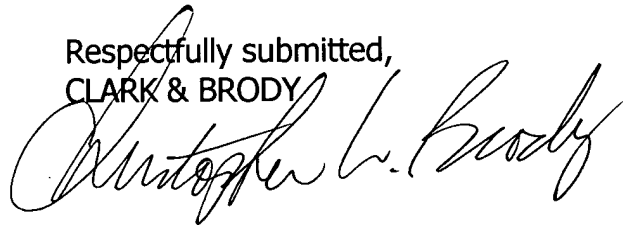
If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated September 4, 2007.

Again, reconsideration and allowance of this application is respectfully requested.

A petition for a two month extension of time is made. A check in the amount of \$460.00 is attached to cover the cost of the petition. Please charge any fee deficiency to Deposit Account No. 50-1088.

Respectfully submitted,  
CLARK & BRODY

A handwritten signature in black ink, appearing to read "Christopher W. Brody", written over the typed name and registration number.

Christopher W. Brody  
Registration No. 33,613

Customer No. 22902  
1090 Vermont Avenue, NW, Suite 250  
Washington, DC 20005  
Telephone: 202-835-1111  
Facsimile: 202-835-1755  
Date: February 4, 2008